

What is claimed is:

1. A method for upgrading firmware in an embedded system, comprising the steps of:
 - providing a processor;
 - providing a non-volatile programmable read only memory device having a fixed vector table, a boot area for storing boot code, a first application area for storing firmware, and a second application area for storing firmware;
 - providing a random access memory device (RAM) having a software vector table and a RAM application area;
 - programming the fixed vector table with a reset vector address and interrupt vector addresses, said reset vector address pointing to the boot code in said boot area and said interrupt vector addresses pointing to corresponding interrupt vector addresses in the software vector table;
 - loading an upgraded version of firmware into one of the first application area or the second application area;
 - resetting the processor to run the upgraded version of firmware; and
 - filling the software vector table with proper corresponding interrupt vector addresses for the interrupt vectors contained in the fixed vector table as determined by the upgraded version of firmware.
2. A method in accordance with claim 1, wherein the non-volatile programmable read only memory device comprises a flash electrically erasable programmable read only memory device (FLASH).
3. A method in accordance with claim 1, wherein a prior version of firmware is running from one application area while the upgraded version of firmware is being loaded into the other application area.
4. A method in accordance with claim 1, further comprising:

providing an erasable programmable memory device (EPROM) which is used to determine which application area will be accessed after the resetting step.

5. A method in accordance with claim 1, further comprising:

loading the RAM application area with data from the application area having the upgraded version of firmware.

6. A method in accordance with claim 1, wherein:

the first application area contains a first version of firmware; and

the second application area contains a second version of firmware.

7. A method in accordance with claim 1, wherein said processor, said non-volatile programmable read only memory device, and said RAM are all provided in the form of a single integrated circuit.

8. An upgradable embedded system apparatus, comprising:

a processor;

a non-volatile programmable read only memory device having a fixed vector table, a boot area for storing boot code, a first application area for storing firmware, and a second application area for storing firmware; and

a random access memory device (RAM) having a software vector table and a RAM application area;

wherein:

the fixed vector table is programmed with a reset vector address and interrupt vector addresses, said reset vector address pointing to the boot code in said boot area and said interrupt vector addresses pointing to corresponding interrupt vector addresses in the software vector table;

an upgraded version of firmware is loaded into one of the first application area or the second application area;

the processor is reset to run the upgraded version of firmware; and
the software vector table is filled with proper corresponding interrupt
vector addresses for the interrupt vectors contained in the fixed vector table as
determined by the upgraded version of firmware.

9. Apparatus in accordance with claim 8, wherein the non-volatile programmable read
only memory device comprises a flash electrically erasable programmable read only
memory device (FLASH).

10. Apparatus in accordance with claim 8, wherein a prior version of firmware is
running from the one application area while the upgraded version of firmware is being
loaded into the other application area.

11. Apparatus in accordance with claim 8, further comprising:

an erasable programmable memory device (EPROM) which is used to determine
which application area will be accessed after the resetting step.

12. Apparatus in accordance with claim 8, wherein:

the RAM application area is loaded with data from the
application area having the upgraded version of firmware.

13. Apparatus in accordance with claim 8, wherein:

the first application area contains a first version of firmware; and
the second application area contains a second version of firmware.

14. Apparatus in accordance with claim 8, wherein said processor, said non-volatile
programmable read only memory device, and said RAM are all provided in the form of
a single integrated circuit.